

Right: Dennis Wells of the Automation, Robotics and Simulation Division helps students unpack parts from their robot kit. Center: From left, a student from Clear Creek Independent School District goes over a shipping list with John Schipper of Lockheed Martin while another student discusses the shipment with Brad Grebinow of Lockheed Martin and a fellow team member.



Brain Strain

JSC employees team up with students to participate in national robot competition

By Karen Schmidt

While most employees head to the house after their eight-hour shift at JSC, some dedicated individuals are spending their time in Bldg. 9 thinking until their brains hurt.

In six weeks, a team of 14 JSC employees will help 37 Clear Creek Independent School District high school students conceive, design, build and test a robot for the For Inspirational and Recognition of Science Technology, or FIRST, national competition. This team—named Integral for the math term that means putting together a lot of pieces—will be one of 154 competing in April for more than 16 awards and scholarships. The project is funded by an educational grant to CCISD and the team is made up of JSC employees, CCISD teachers and students from Clear Brook, Clear Lake and Clear Creek high schools.

The competition is tough, says team lead Charlie Price of the Automation, Robotics and Simulation Division, but the kids are learning a variety of skills they can use in everyday life.

“Not only are the kids learning how math and science are used in the real world, but team, communication and strategy skills as well,” Price says. “We also have stirred the pot here internally. Engineers have gotten in the shops of the Manufacturing, Materials and Process Technology Division more and fabricators are working closely with the engineers and the kids seeing the project through. It’s a win-win-win situation.”

Price, with his team members Henry Kaupp, Todd Yao, Rob Ambrose, Lebarian Stokes, Dennis Wells, Scott Askew, Mike Goza, Ken Jenks, John

Schipper, Brad Grebinow, Roger Megason, Alan Bell and Norm Chaffee, are learning a great deal under a very tight timeline. The team received a 150-plus page rule book Jan. 11 that covers everything from the design phase to the awards banquet. The team is required to ship its robot by Feb. 28.

“The designers said they wanted us to think until our brains hurt,” Price says. “That’s exactly what they have done to us.”

Team meetings are held every night from 4-9 p.m. and all day Saturday and Sunday. A practice arena has been built in Bldg. 9 to test the robot and determine what type of strategy will be used.

“We are building a protoflight. That means that everything that works on this robot will go and everything that doesn’t work we are going to fix before it goes,” Price says.

Design constraints are included. The team received a kit of parts from FIRST and can only purchase specific items in the building of their robot.

“The whole thing can only weigh 120 pounds and must fit in a three-by-three-by-four foot crate for shipping,” says Price. “All of those constraints make it a tremendous tantalizing problem. We found procuring and keeping track of the parts was as essential as the engineering. You have to figure out how to divide the parts to build the system. I asked one of the kids what he had learned so far and he said he has learned the art of compromise.”

Once the robot is built, the team must focus on how to achieve a high score. Competition will take place in a 35-foot hexagonal shaped arena with a rotating goal structure in the center. In the beginning, three teams will compete together to place brightly painted inner tubes on the goal structure. Scores are determined by how the tubes are placed on the structure. The students will operate the robot from a designated area using two joysticks while another student acts as a human player helping the robot confiscate the other teams’ tubes or holding tubes for placement on the goal.

Anything goes during the two-minute competition including foiling opponents scoring attempts. Two coaches—kids or adults—will encourage the joystick operators during playing time. Teams will be eliminated until a winner is determined. The team has spent time developing strategies and those strategies are a closely guarded secret.

“This is the first time this type of competition will be used. In previous years, the game involved balls and a robot. The inner tube concept is new, so I think we have a great shot at winning this thing since no one has tried it before,” Price says.

More than 16 awards and scholarships are up for grabs during the three-day event to be held in April at Disney World’s Epcot Center in Florida. The most prestigious award, the Chairman’s Award, is given to the team that submits

a documentary showing how the project affected team members, their families and the community. This report also is due Feb. 28. Other awards up for grabs are the 1997 National Championship and awards for most creative design, best offensive/ defensive and plays of the game, best team spirit and sportsmanship. Scholarships from industry and educational institutions also are in the mix. The 1997 National Championship trophy will be awarded to the winning team during a special ceremony at the White House.

JSC is not the only NASA center entering the event. Lewis Research Center, Headquarters, Kennedy Space Center and the Jet Propulsion Laboratory each will enter one team and Ames Research Center has three teams that will compete. Overall, nine teams from NASA— including a team from Carnegie Mellon University—will meet in Orlando in April to show off their robots.

Price praised the team and the JSC family for helping make the project a success.

“The Manufacturing, Materials and Process Technology Division have really come through and they are very enthusiastic and cooperative. The JSC graphics folks came up with a terrific logo and the kids are working hard to make this project a success,” Price says.

The most important aspects of the competition are teaching kids about math and science and showing how the project affected team members and its community. But it’s also fun, Price says.

“Make no mistake, we want to inspire these students and show them the fun and excitement of a real world time constraint engineering design project, but we are in this to win,” Price says. □



In order to identify parts, the students and their mentors laid out descriptions of the parts and students matched them up. Since the robot must be built using only the parts sent and the ones on the approved purchase list, procuring and keeping track of the parts was as essential as the engineering. Students learned how to compromise to

get the job done. In six weeks, a team of 14 JSC employees will help 37 high school students conceive, design, build and test a robot for the For Inspirational and Recognition of Science Technology, or FIRST, national competition.